

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

REC'D 14 OCT 2005
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Applicant's or agent's file reference	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/BE 03/00135	International filing date (day/month/year) 13.08.2003	Priority date (day/month/year) 13.08.2003
<p>International Patent Classification (IPC) or both national classification and IPC G21C21/02</p>		
<p>Applicant BELGONUCLEAIRE SA et al.</p>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of sheets.
3. This report contains indications relating to the following items:
- I  Basis of the opinion
  - II  Priority
  - III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV  Lack of unity of invention
  - V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI  Certain documents cited
  - VII  Certain defects in the international application
  - VIII  Certain observations on the international application

Date of submission of the demand  10.05.2004	Date of completion of this report  13.10.2005
Name and mailing address of the International preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Deroubaix, P Telephone No. +49 89 2399-7592



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EXAMINATION REPORT**

International application No. PCT/BE 03/00135

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-11 as originally filed

**Claims, Numbers**

1-4 filed with telefax on 12.09.2005

**Drawings, Sheets**

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-4
	No: Claims	
Inventive step (IS)	Yes: Claims	1-4
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-4
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

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**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: US-A-5 123 410 (WYMAN DENNIS J ET AL) 23 June 1992 (1992-06-23)
- D2: US-A-2 606 792 (MARSH HOWARD E) 12 August 1952 (1952-08-12)
- D3: US-A-3 422 505 (SLEMMONS CHARLES O) 21 January 1969 (1969-01-21)
- D4: EP-A-0 646 742 (WESTENBERG MARTIN) 5 April 1995 (1995-04-05)
- D5: US-A-3 844 002 (SLEMMONS C) 29 October 1974 (1974-10-29)
- D6: US-A-4 748 798 (SEKINE TAKASI ET AL) 7 June 1988 (1988-06-07)

Claim 1 lacks clarity because it is not clear what the words "retracted" and "inflated" refer to. It should have been mentioned that the sealing device comprises a retractable and inflatable member intended for providing the sealing.

In claim 2 should hence have been specified that the retractable and inflatable member consists in an elastomer tubular membrane and that the sealing device further comprises...

It must be specified that the elastomer membrane is tubular as otherwise it is not clear what its inner diameter is.

In claims 3 and 4 it is not clear what the "free state" is. Said state is probably the non-inflated state, i.e. the state previously referred to as "retracted state".

Provided that the defects giving rise to the above objections with regard to clarity are duly eliminated, it appears that the search has not given occasion for revealing any document wherein a sealing device exhibiting the features of claim 1 is disclosed (see the documents D1-D6, which are considered to disclose the most relevant state of the art; D1-D5 disclosing similar devices for grasping tubes; D6 disclosing an apparatus for loading nuclear fuel pellets into a fuel rod tube).

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This being kept in view, the subject-matter of claim 1 of the present application appears to be new (Article 33(2) PCT) and to meet a need for solving the problems arising in the production of nuclear fuel rods in an inventive manner (Article 33(3) PCT).

Claims 2-4 are dependent on claim 1 and as such, with the same proviso as regards clarity, appear to be allowable and to meet the requirements of the PCT with respect to novelty and inventive step.

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### Claims

1. Sealing device (10) intended for providing a sealing between an aperture of an enclosure (7) and the outer surface of a nuclear fuel rod cladding (1) inserted through said aperture, characterized by three states:

- 5        - a state retracted for contactless insertion of said nuclear fuel rod cladding (1) through the aperture,
- a state Inflated at a moderate pressure for providing said sealing while enabling axial and/or rotational movement of said nuclear fuel rod cladding, and
- a state inflated at a higher pressure for providing said sealing while said  
10 said nuclear fuel rod cladding is at rest.

2. The sealing device according to claim 1, comprising:

- a support (12) crossed by a channel extending between an inlet and an outlet of said aperture, for allowing insertion of said nuclear fuel rod cladding,
- an elastomer membrane (8), extending along said channel, this membrane  
15 (8) having two end parts acting as leak tight attachment to said support (12), its inner diameter being, in free state, slightly smaller than the outside diameter of said fuel cladding (1), and
- a leak tight chamber located between the support (12) and the elastomer membrane (8), and arranged so that the elastomer membrane may be  
20 deformed in the radial direction inwards into said chamber or outwards against the nuclear fuel rod cladding (1), a gas supply system (14) being provided to inflate or deflate the membrane (8).

- 25 3. The sealing device as claimed in claim 2, wherein the elastomer membrane (8) is sized so that, in free state, said membrane is in leak tight sliding contact with said nuclear fuel rod cladding (1) for axial and/or rotational nuclear fuel rod cladding movement.

- 30 4. The sealing device as claimed in either of claims 2 and 3, wherein the elastomer membrane (8) presents an axial inner section that, in free state, is decreasing from one end to its midplane and increasing towards its second end.